

REMARKS

Reconsideration and allowance of the present patent application based on the following remarks are respectfully requested. Claim 16 has been amended merely to correct a typographical error without the intention of narrowing the scope of any of the claims. Claims 14 and 15 have been cancelled without prejudice or disclaimer. Applicant has amended the currently pending claims in order to expedite prosecution and does not, by this amendment, intend to abandon subject matter of the claims as originally filed or later presented, and reserves the right to pursue such subject matter in a continuing application. No new matter has been added. Claims 1-13 and 16-20 are pending.

Entry of the Amendment is proper under 37 C.F.R. §1.116 as the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not present any new issues that would require further consideration and/or search as the amendments merely amplify issues discussed throughout the prosecution; (c) do not present any additional claims without canceling a corresponding number of claims; (d) place the application in better form for appeal, should an appeal be necessary; and (e) were not made earlier because they are made in response to the points first presented in the final Office Action. Entry of the Amendment is thus respectfully requested along with withdrawal of the final Office Action.

Examiner's Response to Applicant's Arguments of February 21, 2006

In response to Applicant's arguments regarding independent claims 1, 13 and 16, the Examiner stated that an optical element configured to redistribute an intensity distribution such that the intensity distribution is asymmetric is disclosed by "the optical element (20) disclosed by Shinoda [which] further inclines the distribution by shifting the optical element ([0075], lines 6-7). Further, the pupil transmittance distribution reaches the substrate at an off-axis ([0083], lines 6-8)."

Applicant respectfully maintains that Shinoda does not clearly disclose, teach or suggest an optical element constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes as recited in claims 1, 13 and 16.

As noted previously, optical element 20 of Shinoda is a filter that adjusts a light intensity distribution, in particular so that peripheral transmittance is higher than central transmittance. See, e.g., Shinoda et al, paragraph 63. The filter 20 of Shinoda does not redistribute an intensity distribution, rather it merely removes light from the beam to adjust the spatial distribution of intensity. Losing radiation beam intensity is disadvantageous and Applicant's claimed invention has a possible advantage of maintaining the intensity of the beam of radiation. See, e.g., paragraph 14 of Applicant's specification in the context of a reflective embodiment. So, to account for a lower peripheral transmittance, the filter 20 of Shinoda removes light intensity from the center to compensate for the lower peripheral transmittance. Instead, for mainly a different purpose of imaging structures that extend in a direction other than the X- and/or Y- direction, the claimed optical element is configured to redistribute the radiation, e.g., move the radiation, such that the intensity distribution becomes asymmetric with a possible advantage of no or low intensity loss.

The above comments are no different for optical element 20 of paragraph 75 of Shinoda as that optical element 20 is also a filter having different transmittances. The difference between optical element 20 of paragraph 75 with that discussed in paragraph 63 is that it is inclined. However, the optical element of paragraph 75 of Shinoda still uses lower transmittance to remove light from the light beam to adjust the light intensity distribution. See Shinoda, paragraph 76.

Moreover, the statement in Shinoda that the pupil transmittance distribution that reaches the substrate off-axis is likely to provide a rotationally asymmetric distribution does not disclose, teach or suggest an optical element constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes. Rather, as noted in paragraph 10 of Shinoda, "...the transmittance near the optical axis appears to be low because a light transmitting element, such as a lens, is thick at its center part and thin at its peripheral in view of the glass material's transmittance, but the transmittance at the peripheral actually becomes lower because a coating or reflection prevention film affects the transmittance more greatly. This is because the transmittance decreases more remarkably as a refraction angle of light incident onto the optical element becomes larger due to the coating, and the light transmitting through the peripheral of the light transmitting element has larger refraction angle than that transmitting through its center part." In other words, light is merely blocked by low transmittance at the periphery (off-axis) parts of the light transmitting elements, the obverse of the filter 20. However, this cited portion of Shinoda does not disclose, teach, or suggest

redistributing the intensity distribution as claimed but rather the different removal of radiation by using lower transmittance.

Accordingly, Applicant respectfully maintains that Shinoda fails to disclose, teach or suggest an optical element constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes as recited in claims 1, 13 and 16.

In response to Applicant's arguments regarding independent claim 14, the Examiner stated that an optical element constructed and arranged to rotate an intensity distribution of a beam of radiation over an angle between 5 and 85 degrees is disclosed by "the optical element is capable of adjusting to a shift amount ([0076], lines 1-4). Therefore, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim."

Applicant has cancelled claim 14 without prejudice or disclaimer and reserves the right to reintroduce such subject matter or pursue such subject matter in a continuing application. Accordingly, the rejection of claim 14 is now moot.

Rejections of Claims 1-4, 13-14 and 16 under 35 U.S.C §102(e) and
Claims 5 and 7-11 under 35 U.S.C. §103(a)

Claims 1-4, 13-14 and 16 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0151730 to Shinoda ("Shinoda"). Applicant respectfully traverses the rejection, without prejudice.

Applicant respectfully submits that the cited portions of Shinoda fail to disclose, teach or suggest a lithographic apparatus including an illumination system configured to condition a beam of radiation, the illumination system comprising, *inter alia*, an optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes as recited in independent claim 1. Further, Applicant respectfully submits that the cited portions of Shinoda fail to disclose, teach or suggest an illumination system including, *inter alia*, a reflective optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is

asymmetric with respect to at least one of the X and Y axes as recited in independent claim 13. Further, Applicant respectfully submits that the cited portions of Shinoda fail to disclose, teach or suggest a lithographic apparatus comprising, *inter alia*, an illumination system configured to condition a beam of radiation wherein the illumination system comprises, *inter alia*, an optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes as recited in independent claim 16.

The Examiner refers to element 20 and paragraphs 19 and 63 of Shinoda as allegedly disclosing, teaching or suggesting an optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes. Respectfully, those cited portions merely refer to a filter that adjusts a light intensity distribution, in particular so that peripheral transmittance is higher than central transmittance. Shinoda et al, paragraph 63. As discussed above, the filter 20 of Shinoda, whether as disclosed in paragraph 63 or paragraph 75 of Shinoda, removes light intensity from the light beam; the filter 20 of Shinoda does not redistribute the intensity distribution. Thus, Applicant submits Shinoda does not address the matter of redistributing an intensity distribution such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes.

Paragraph 19 merely discloses that the adjusting mechanism of Shinoda may adjust the light distribution with respect to a rotationally asymmetric component (as well as a rotationally symmetric component) but does not disclose, teach or suggest an optical component configured to actually redistribute an intensity distribution such that the intensity distribution is asymmetric. Shinoda merely states that its adjusting mechanism will work for a light distribution that has an asymmetric component and simply fails to disclose, teach or suggest the different concept of redistribution, let alone redistribution in an asymmetric manner.

Applicant has cancelled claim 14 without prejudice or disclaimer and accordingly, the rejection of claim 14 is now moot.

Therefore, for at least the above reasons, the cited portions of Shinoda fail to disclose, teach or suggest all the features recited by independent claims 1, 13, 14 and 16. Claims 2-4 depend from claim 1 and are, therefore, patentable for at least the same reasons provided above related to claim 1, and for the additional features recited therein. As a result, Applicant respectfully submits that the rejection under 35 U.S.C. §102(e) of claims 1-4, 13-14 and 16 in view of Shinoda should be withdrawn and the claims allowed.

Claims 5 and 7-10 stand rejected under 35 U.S.C. §103(a) as being obvious in view of Shinoda further in view of U.S. Patent No. 5,859,707 to Nakagawa et al. ("Nakagawa et al."). Applicant respectfully traverses the rejection, without prejudice.

Applicant respectfully submits that the comments above with respect to Shinoda regarding claim 1 apply equally to claims 5 and 7-10 which depend from independent claim 1. Furthermore, the cited portions of Nakagawa et al. fail to overcome any of the deficiencies of Shinoda. For example, the cited portions of Nakagawa et al. fail to disclose, teach or suggest an optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes, wherein, in use, the intensity distribution is asymmetric with respect to at least one of the X and Y axes at least at a position of a substrate to be exposed by the beam of radiation as recited in claim 1.

Previously, Applicant referred to Nakagawa as failing to disclose, teach or suggest a field defining element as claimed in claim 1, an element configured to define the illuminating field off-axis with respect to the optical axis of the illumination system. Clearly, claim 1 does not recite such an element and thus this was in error. Applicant intended to refer to Nakagawa as failing to disclose, teach or suggest an optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes as recited in claim 1.

Because the cited portions of Shinoda and Nakagawa et al. taken singly or in any proper combination, fail to disclose, teach or suggest the claimed subject matter of claims 5 and 7-10, Applicant respectfully requests that the rejection under 35 U.S.C. §103(a) of claims 5 and 7-10 based on Shinoda in view of Nakagawa et al. be withdrawn and the claims allowed.

Claim 11 stands rejected under 35 U.S.C. §103(a) as being obvious in view of Shinoda and Nakagawa et al. and further in view of U.S. Patent No. 6,102,554 to Willson et al. ("Willson et al."). Applicant respectfully traverses the rejection, without prejudice. Applicant respectfully submits that the comments above with respect to Shinoda and Nakagawa et al. regarding claim 1 apply equally to claim 11 which depends from independent claim 1. Furthermore, the cited portions of Willson et al. fail to overcome any of the deficiencies of Shinoda. For example, the cited portions of Willson et al. fail to disclose, teach or suggest an optical element, constructed and arranged to redistribute an intensity

distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes, wherein, in use, the intensity distribution is asymmetric with respect to at least one of the X and Y axes at least at a position of a substrate to be exposed by the beam of radiation as recited in claim 1.

Previously, Applicant referred to Willson et al. as failing to disclose, teach or suggest a field defining element as claimed in claim 1, an element configured to define the illuminating field off-axis with respect to the optical axis of the illumination system. Clearly, claim 1 does not recite such an element and thus this was in error. Applicant intended to refer to Willson et al. as failing to disclose, teach or suggest an optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes as recited in claim 1.

Because the cited portions of Shinoda, Nakagawa et al. and Willson et al. taken singly or in any proper combination, fail to disclose, teach or suggest the claimed subject matter of claim 11, Applicant respectfully requests that the rejection under 35 U.S.C. §103(a) of claim 11 based on Shinoda in view of Nakagawa et al. and further in view of Willson et al. be withdrawn and the claim allowed.

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

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Please charge any fees associated with the submission of this paper to Deposit Account Number 033975 under our order no. 081468/0309024. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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